

DESCRIPTION OF WORK AND VALIDATION PROCEDURE FOR WR2300 WAVEGUIDE SHUTTERS (ref: WORK REQUEST # 16365)

A. DESCRIPTION OF WORK TO BE PERFORMED

This work involves routine maintenance and visual inspection of the Building 420 WR2300 waveguide shutters, specifically the shutters involved with RF3/5 isolation and the RF Test Stand.

This work will include visual inspection of the waveguide interior of the shutter for inspection of the rf contact surfaces critical to the isolation performance of the shutters, and also visual inspection and routine maintenance of exterior mechanisms utilized to actuate the shutter.

NOTE: This work will be performed during the 2004-2005 holiday shutdown, with all five 350MHz rf systems under MCR and individual LOTO.

For the RF3/5 waveguide shutters, this work will consist of the following discrete steps (see figure 1):

1. Remove 90°-miter waveguide piece at flanges # 368 and # 369.
2. Remove all connectors from both waveguide shutters.
3. Unlock kirk locks on both shutters, and remove administrative LOTO locks on the shutter control power feeds.
4. Use the Mega shutter test box to fully open the Mega shutter. Remove the 120vac line cord from the shutter when the vane is in the fully-open position.
5. Use the Dielectric shutter test box to move the Dielectric shutter vane to the best position for visual inspection of the fingerstock on the movable vane. Remove the 120vac line cord from the shutter when the vane is positioned for inspection.
6. Use the Mega shutter test box to move the shutter vane to the best position to view the fingerstock on the edge of the vane. Remove the 120vac line cord from the shutter when the vane is positioned for inspection.
7. After the inspection, use the shutter test box to move both shutters to the fully-open position to verify that the shutter vanes are fully deployed into the waveguide wall slots.

8. Re-install the 90°-miter waveguide piece at flanges # 368 and # 369.
9. Perform visual inspection of the shutter drive mechanism on both shutters, and perform routine maintenance as necessary.



Figure #1 – RF3/5 Waveguide Shutter Installation

For the RF Test Stand waveguide shutters, this work will consist of the following discrete steps (see figure 2):

1. Remove flexible waveguide piece at flanges # 180 and # 181.
2. Remove all connectors from both waveguide shutters.

Notify MCR prior to removing the connectors. Removing the ACIS connectors from the shutters could result in an ACIS alarm in MCR.

3. Use the Mega shutter test box to fully open the Mega shutter. Remove the 120vac line cord from the shutter when the vane is in the fully-open position.
4. Use the Dielectric shutter test box to move the Dielectric shutter vane to the best position for visual inspection of the fingerstock on the movable vane. Remove the 120vac line cord from the shutter when the vane is positioned for inspection.
5. Use the Mega shutter test box to move the shutter vane to the best position to view the fingerstock on the edge of the vane. Remove the 120vac line cord from the shutter when the vane is positioned for inspection.
6. After the inspection, use the shutter test box to move both shutters to the fully-open position to verify that the shutter vanes are fully deployed into the waveguide wall slots.
7. Re-install the flexible waveguide piece at flanges # 180 and # 181.
8. Perform visual inspection of the shutter drive mechanism on both shutters and perform routine maintenance as necessary.



Figure #2 – RF Test Stand Waveguide Shutters

B. DESCRIPTION OF VALIDATION AFTER WORK IS PERFORMED

After visual inspection of the shutters and re-assembly of the waveguide, the following steps will be completed to insure that both of the RF3/5 waveguide shutters are in the closed position and are rendered incapable of being moved from the closed position either manually or electrically:

1. Both RF3/5 waveguide shutters will be moved to the closed position utilizing the respective drive motors. This will be done utilizing individual control boxes that can be connected to the shutters locally. Verification of the fully-closed position will be made by viewing the dedicated ACIS “chain A” and “chain B” lights on each shutter, and a confirming pattern of “closed” lights on each shutter local test box. **This step is to be witnessed by ACIS, Operations, and RF Group personnel.**
2. Both shutters will then be locked in the closed position utilizing the “Kirk” locking mechanism on each shutter. **This step is to be witnessed by ACIS, Operations, and RF Group personnel.**
3. Re-install all connectors on both waveguide shutters. **This step is to be witnessed by ACIS, Operations, and RF Group personnel.**
4. The captured “Kirk” lock will then be handed over to Operations for LOTO, overlocked by both Operations and ACIS.
5. Operations, ACIS, and RF Group personnel will LOTO the dedicated AC power feeds to each RF3/5 waveguide shutter control junction boxes. This will electrically isolate the actuation motor in each shutter.
6. Waveguide bolts on flanges # 368 and # 369 will be torqued to 35 ft-lbs, witnessed and independently verified by a second person. **Document this torquing procedure in the on-line waveguide flange log at the time it is completed.**
7. When rf operation is resumed, waveguide flanges # 368 and # 369 will be sniffed for leakage with RF3 operating at approximately 10kW rf power output. **Document this sniffing procedure in the on-line waveguide flange log at the time it is completed.**

After visual inspection of the shutters and re-assembly of the waveguide, the following steps will be completed to insure that both of the RF Test Stand waveguide shutters are returned to normal operation conditions and are fully functional:

1. Both RF Test Stand waveguide shutters will be moved to the closed position utilizing the respective drive motors. This will be done utilizing individual control boxes that can be connected to the shutters locally. Verification of the fully-closed position will be made by viewing the dedicated ACIS “chain A” and “chain B” lights on each shutter, and a confirming pattern of “closed” lights on each shutter local test box.
2. Re-install all connectors on both waveguide shutters.

Notify MCR prior to re-installing the ACIS connectors. Attaching the ACIS connectors to either shutter could result in an ACIS alarm in MCR.

3. Test the open/close operation of both shutters using the RF Test Stand control system, verifying that the Test Stand ACIS system correctly indicates the correct status of both shutters in the open and closed positions. *This validation test must be carried out with the assistance of ACIS personnel.*
4. Waveguide bolts on flanges # 180 and # 181 will be torqued to 35 ft-lbs, witnessed and verified by a second person. *Document this torquing procedure in the on-line waveguide flange log at the time it is completed.*
5. When RF Test Stand operation is resumed, waveguide flanges # 180 and # 181 will be sniffed for leakage with RF1 operating at approximately 10kW rf power output. *Document this sniffing procedure in the on-line waveguide flange log at the time it is completed.*

Work Approval Signatures

Prepared by:

_____ Date: _____

RF Group Leader:

_____ Date: _____

ASD Associate Division Director:

_____ Date: _____

ESH Coordinator:

_____ Date: _____